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(54) **Heat-sensitive optical probes**

(57) A method of directing energy to tissue includes the initial steps of determining target tissue location and/or target tissue margins, positioning an ablation device for delivery of energy to target tissue, and positioning one or more heat-sensitive optical probes into a tissue region to be monitored. Each heat-sensitive optical probe is adapted to utilize spectral properties of light to access one or more optical fiber portions of the heat-sensitive optical probe in response to heat. The method also includes the steps of applying energy to the ablation device,

continuing ablation while size and/or position of ablated zone which received heat above a threshold value is displayed on a monitor using one or more electrical signals generated by the one or more heat-sensitive optical probes, determining whether the ablated zone displayed on the monitor is larger than the target tissue margins, and terminating ablation if it is determined that the ablated zone displayed on the monitor is larger than the target tissue margins.

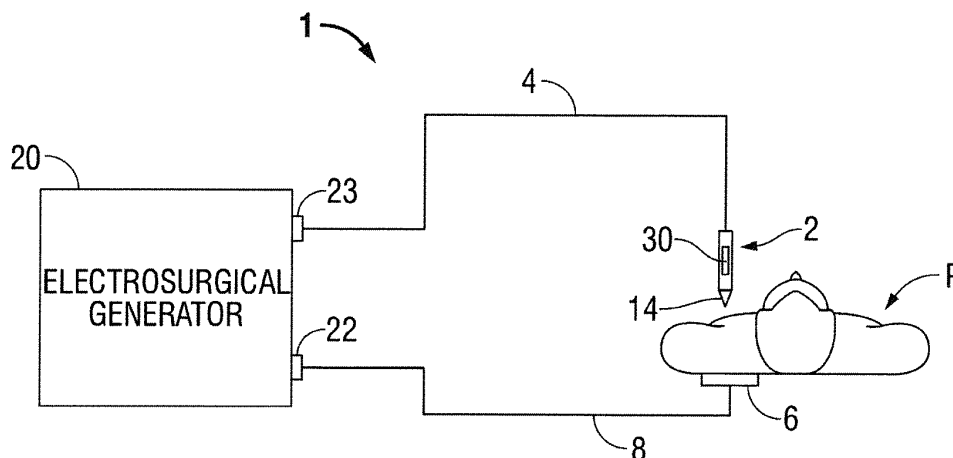


FIG. 1



EUROPEAN SEARCH REPORT

Application Number
EP 13 18 6382

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	WO 2012/071388 A2 (SECURUS MEDICAL GROUP INC [US]; FLAHERTY J CHRISTOPHER [US]; GARIBOTTO) 31 May 2012 (2012-05-31)	1-9,11	INV. G01K11/32 A61B18/12 A61B18/14
Y	* paragraph [0118]; figure 6 * * paragraph [0137]; claim 293; figure 12 * * figure 9 * * paragraphs [0104], [0172] *	10,12	
Y	----- US 4 523 092 A (NELSON ARTHUR R [US]) 11 June 1985 (1985-06-11) * column 4, lines 4-41; figures 2,3 * * column 5, lines 1-5 * * column 3, lines 33-34 *	10,12-15	
Y	----- US 4 691 709 A (COHEN DONALD M [US]) 8 September 1987 (1987-09-08) * column 8, lines 11-13 * * column 10, lines 16-58 * * column 9, lines 26-44; figure 6 * * column 7, lines 36-37 * * column 10, line 66 - column 11, line 11 *	13-15	
A	----- US 2008/183165 A1 (BUYSSE STEVEN PAUL [US] ET AL) 31 July 2008 (2008-07-31) * paragraphs [0093], [0094] * * paragraph [0046]; figure 1 *	1-9,11	TECHNICAL FIELDS SEARCHED (IPC) G01K A61B
A	----- US 2011/301590 A1 (PODHAJSKY RONALD J [US] ET AL) 8 December 2011 (2011-12-08) * claims 5, 6 *	1-9,11	
A	----- US 5 560 712 A (KLEINERMAN MARCOS Y [US]) 1 October 1996 (1996-10-01) * column 5, line 10 - column 6, line 25; figures 2--4 *	1,11	
----- -/--			
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 26 March 2014	Examiner Schmidt, Matthias
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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EPO FORM 1503 03.82 (P04C01)



EUROPEAN SEARCH REPORT

Application Number
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DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	WO 87/02769 A1 (LUXTRON CORP [US]) 7 May 1987 (1987-05-07) * abstract; figure 3 *	1,11	
A	WO 2010/102117 A1 (IMRICOR MEDICAL SYSTEMS INC [US]; JESTER STEVEN J [US]; STENZEL GREGG) 10 September 2010 (2010-09-10) * paragraph [0062]; figure 6 *	1,11	
			TECHNICAL FIELDS SEARCHED (IPC)
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 26 March 2014	Examiner Schmidt, Matthias
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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CLAIMS INCURRING FEES

The present European patent application comprised at the time of filing claims for which payment was due.

☐ Only part of the claims have been paid within the prescribed time limit. The present European search report has been drawn up for those claims for which no payment was due and for those claims for which claims fees have been paid, namely claim(s):

☐ No claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for those claims for which no payment was due.

LACK OF UNITY OF INVENTION

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

see sheet B

☒ All further search fees have been paid within the fixed time limit. The present European search report has been drawn up for all claims.

☐ As all searchable claims could be searched without effort justifying an additional fee, the Search Division did not invite payment of any additional fee.

☐ Only part of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the inventions in respect of which search fees have been paid, namely claims:

☐ None of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims, namely claims:

☐ The present supplementary European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims (Rule 164 (1) EPC).



**LACK OF UNITY OF INVENTION
SHEET B**

Application Number
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The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

1. claims: 1-9, 11

temperature-dependent control of an energy applicator in an
electrosurgical system

2. claims: 10, 12-15

a distributed intensity-based fiber optic sensor for
localised temperature measurement along an optical fibre

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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26-03-2014

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 2012071388 A2	31-05-2012	AU 2011332014 A1 CN 103442631 A EP 2642913 A2 US 2014012155 A1 WO 2012071388 A2	18-07-2013 11-12-2013 02-10-2013 09-01-2014 31-05-2012
US 4523092 A	11-06-1985	NONE	
US 4691709 A	08-09-1987	NONE	
US 2008183165 A1	31-07-2008	US 2008183165 A1 US 2012271303 A1 US 2012271306 A1 US 2014058384 A1	31-07-2008 25-10-2012 25-10-2012 27-02-2014
US 2011301590 A1	08-12-2011	AU 2011202651 A1 CA 2741945 A1 US 2011301590 A1	22-12-2011 03-12-2011 08-12-2011
US 5560712 A	01-10-1996	US 5560712 A US 5820265 A	01-10-1996 13-10-1998
WO 8702769 A1	07-05-1987	AU 6626586 A CA 1292368 C EP 0243482 A1 US 4752141 A WO 8702769 A1	19-05-1987 26-11-1991 04-11-1987 21-06-1988 07-05-1987
WO 2010102117 A1	10-09-2010	CA 2754124 A1 CA 2839071 A1 CN 102341038 A EP 2403402 A1 US 2011299565 A1 US 2013039384 A1 WO 2010102117 A1	10-09-2010 10-09-2010 01-02-2012 11-01-2012 08-12-2011 14-02-2013 10-09-2010

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82